EXPLORING ANTICANCER ACTIVITY OF BLUMEA SPECIES

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1. Introduction

Cancer is a fatal disease that is caused when cells in the body grow or divided in an uncontrolled manner. Cancer is the second dreadful and very serious disease in the world. It causes about 13% of all annual deaths worldwide (Thokar *et al*., 2017) The Egyptians were the first to observe tumors arising in different parts of the body in 3500 BC and in 2000 BC in the classical manuscripts of the Ramayana it was recorded as a disease. Scientific enquiries were first made by Sir Percival Pott in 1775 AD and since then several scientists have been trying to discover the factors responsible for cancer (SandhyaKumari*et al*., 2012)

Medicinal plants are a precious heritage for humanity; our ancestors used these plants to ensure their health and transmitted their knowledge and their experiences generation to generation (Senhaji*et.al*.,2017). Plants have continuously a constituent of natural product for the treatment of various diseases. The medicinal value of these plants can be perceived from the chemical agents they possess which may alter certain physiologic actions in the human body. The most important of these bioactive constituents of plants are terpenes, alkaloids, flavonoids and phenolic compounds. According to World health organization (WHO) more than 80% world's population depends on medicines derived from these medicinal plants for primary health care needs. The use of medicinal plants as a source for relief from illness can be traced back over since before recorded history. These phytomedicines are safe and environment friendly. (Salem *et. al*., 2016)

At present, enthusiasm remains high among scientists involved in the discovery of new potential anticancer agents from plants since the approval of taxol; the first novel antimicrotubule agent approved for clinical use in the treatment of ovarian, breast, lung, head and neck cancers. (Ateya*et al*., 2014)

Today, despite considerable efforts, cancer still remains an aggressive killer worldwide. Moreover, during the last decade, novel synthetic chemotherapeutic agents currently in use clinically have not succeeded in fulfilling expectations despite the considerable cost of their development. Therefore, there is a constant demand to develop new, effective, and affordable anticancer drugs. From the dawn of ancient medicine, chemical compounds derived from plants have been used to treat human diseases. Natural products have received increasing attention over the past 30 years for their potential as novel cancer preventive and therapeutic agents. In parallel, there is increasing evidence for the potential of plant-derived compounds as inhibitors of various stages of tumorigenesis and associated

inflammatory processes, underlining the importance of these products in cancer prevention and therapy.(Soloweyet *al*.,2014)

Medicinal plants play a very important role in the treatment of cancer. Herbal anticancer drugs are cheap and there is no side effect in practicing of these drugs for treatment. (Irfan *et al.*, 2017).Compared with synthetic chemotherapeutic drugs, plant-derived natural chemicals are relatively low-toxic, possess high target specificity and are generally available in an ingestive form for cancer treatment (Chao *et. al.*,2017).

The present study has therefore been designed to determine the various anticancer activities of medicinal plants.

2. Review of Literature

Abdul *et.al.*, (2013) reported that the medicinal plants have bioactive compounds which are used against various diseases. The present study used various plants like *Acacia nilotica, Psidium gujauva, Luffa cylindrical, Morus alba, Morus nigra, Momordica charantia, Fagonia cretica, Punica granatum, Ficus palmate* and *Prunus persica.* Result shows the presence of secondary metabolites like terpenoids, phlobtannins, reducing sugar, flavonoid and alkaloids. These secondary metabolites are source for various new drug formations.

Lebri*et.al.*, (2015) present study aims to evaluate the phytochemical analysis and in vitro anticancer activity of aqueous extract of *Abrus precatorius.* Extract of leaves shows the presence of various chemical groups like alkaloids, flavonoids, tannins, coumarin, sterol, terpenoids, Saponin and reducing compounds. In vitro anticancer effect shows dose dependent cytotoxic effect. Therefore, the aqueous extract of *Abrus precatorius* leaves could be useful for the development of therapeutic agents against cancer.

Simon and Jayakumar (2016) reported that the *Gloriosa superba* plant contains a large amount of alkaloids like colchicine and glorisine. The present study involves the antioxidant and anticancer examination of plant extract on Hep-G2 cells (human liver cancer cells). Results shows that the methenolic extract shows the highest potential of antioxidant activity therefore it is proceed for anticancer activity and it shows higher inhibition. Thus,*Gloriosa superba* has potential to inhibit the human carcinoma cell line.

Minhajur Rahman et. al. (2017) reported that the plants have cancer healing property due to their bioactive secondary metabolites. Phytochemical are the dependable source for the different health problems. In present study phytochemical screening was done for 23 anticancer medicinal plant species representing 17 families of polypetalae. The results shows the uneven distribution and abundance of different secondary metabolites. Alkaloids were present in all plant species while 17 plant species contain flavonoids, 12 contain sterol, 5

contain resins, 13 contains tannins, 15 contains glycosides and 10 contains saponins. These natural products can be useful for the cancer therapy.

3. Objectives of Research

- Selection and collection of plants,
- Extraction and purification,
- Characterization of compounds
- Anticancer activity.

4. Methodology to be accepted

Selection of plant material:-Plants having medicinal activities will select for work.

Sample collection:- healthy plant parts will be collected for research work.

Extraction:- different solvents will be used for the extraction by using Soxhlet apparatus method.

Characterization of plant extracts, Anticancer activity of extracts.

5. Importance of study

India has tremendous wealth of aromatic and medicinal plants. In current days medicinal plants play a key role as pillar of traditional healthcare systems of medicine in many developing countries. Several drugs have been formulated using the bioactive compounds present in these medicinal plants. Plants have the rich source of various chemical compounds to use as the traditional drugs (Waseem *et. al.,* 2017)

Cancer is one of the most life-threatening diseases, with more than 100 different types occurring due to some molecular changes within the cell. It is estimated that 12.5% of the population dies due to cancer. Conventional therapies cause serious side effects and, at best, merely extend the patient's lifespan by a few years. Cancer treatments with milder side effects are desperately needed. Medicinal plants have a special place in the management of cancer. It is estimated that plant-derived compounds in one or the other way constitute more than 50% of anticancer agents. Numerous cancer research studies have been conducted using traditional medicinal plants in an effort to discover new therapeutic agents that lack the toxic side effects associated with the present chemotherapeutic agents (Rama Bhat 2017).

1. International status

Sevastre *et al*., (2017) investigated the in vitro anticancer effect of *Euonymus europaeus* on human melanoma cells. *Euonymus europaeus* shows significant and selective antitumor activity.

Liang *et al*., (2017) studied the anticancer activity of 10 selected medicinal plans on 4 cancer call lines namely MCF-7, BALL-1, Huh-7 and HeLa cell lines. Each plant showed anticancer activity against at least one of the four cell lines, so the results provided new evidence for anticancer activity of these plants which could be useful for developing new anticancer therapies.

Owolabi*et al., (*2018) reported the phytochemical, antioxidant and anti-inflammatory potential of root bark extract of *Feretia apodanthera.*

2. National status

Gurupriya *et al*(2017) studied the qualitative and quantitative phytochemical analysis of leaf extract of *Simarouba glauca* plant. Leaf of the plant are found to have maximum amount of phytocompounds.

Rama Bhat(2017) reported anticancer activity of extracts of leaves,bark and fruits of *Gymnacranthera farquhariana*, *Myristica fatua* var. *magnifica* and Samadera indica.

Puranik *etal.*,(2017) reported the invitro antioxidant and invitro anticancer activity of *Simarouba glauca* leaf extract on T-24 bladder cancer cell line. Results strengthen the potential property of *Simarouba glauca* as a resource for the discovery of novel antioxidant and anticancer agents.

3. Significance of the study

Plants have highest medicinal property it can be used as an alternative for synthetic drugs. In our research we will be isolating novel compounds from plant extracts which may show potential anticancer activities.

6. Proposed work plan

Year wise plan of work and targets to be achieved

Year 1:

1) Review of literature

2) Collection of plants

3) Extraction of plant samples

Year 2:

1) Characterization of plant extracts.

Year 3:

1) Screening for anticancer activity of plant extracts.

2) Thesis writing and submission.

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